

What Is Claimed Is:

1. A method for bidirectional single-wire data transmission of data information between a control unit (2) and at least one peripheral unit (3) having the following steps:

generating a first current flow from the control unit (2) to the peripheral unit (3) during first time slots via a single-wire line (4) to transmit voltage-coded or current-coded information from the control unit (2) to the peripheral unit (3); and/or

generating a second current flow from the peripheral unit (3) to the control unit (2) during second time slots via the single-wire line (4) to transmit voltage-coded or current-coded information from the peripheral unit (3) to the control unit (2);

the first and second time slots being implemented so they do not mutually overlap;
and

generating additional information to be transmitted and/or uploaded in the first and/or second time slots, which is transmitted as digital or analog signals by modulating the current or the voltage of the single-wire line (4) and is analyzed in the control unit (2) or the peripheral unit (3).
2. The method as recited in Claim 1,
wherein the peripheral unit (3) is connected to its own power supply.
3. The method as recited in one of Claims 1 or 2,
wherein the peripheral unit (3) is activated by the first current flow from the control unit (2) to the peripheral unit.
4. The method as recited in at least one of the preceding claims,
wherein the information to be transmitted and/or uploaded occurs in real-time.
5. The method as recited in at least one of the preceding claims,
wherein the information to be transmitted and/or uploaded is implemented as a digital signal on two or more stages.

6. The method as recited in at least one of the preceding claims, wherein the information to be uploaded from the peripheral unit (3) to the control unit (2) is implemented as a diagnostic signal for diagnosis of the peripheral unit (3).
7. The method as recited in at least one of the preceding claims, wherein the proper function of the single-wire interface is diagnosed.
8. The method as recited in at least one of the preceding claims, wherein the information to be uploaded from the peripheral unit (3) to the control unit (2) is implemented as the basis for calculating a new control signal for controlling the peripheral unit (3).
9. A device for bidirectional single-wire data transmission of data information between a control unit (2) and at least one peripheral unit (3), comprising:

first means, provided in the control unit, for generating a first current flow for transmitting voltage-coded or current-coded information from the control unit (2) to the peripheral unit (3) during first time slots via a single-wire line (4); and/or

second means, provided in the peripheral unit (3), for generating a second current flow for transmitting voltage-coded or current-coded feedback information from the peripheral unit (3) to the control unit (2) during second time slots via the single-wire line (4); and

means for modulating the current or the voltage of the single-wire line (4) in the first and/or second time slots for additional information to be transmitted and/or uploaded, which is transmitted as digital or analog signals, and means in the control unit (2) or the peripheral unit (3) for its detection.

10. The device as recited in Claim 9, wherein the control unit (2) is implemented as an engine control unit.
11. The device as recited in Claim 9 or 10, wherein the peripheral unit (3) is implemented as a component having electronics, for example, as an ignition coil or fuel injector of a motor vehicle engine or the like.

12. The device as recited in at least one of Claims 9 through 11, wherein the means are made of resistors and switches or current sources or voltage sources for an alteration in the voltage-coded or current-coded information.
13. The device as recited in at least one of Claims 9 through 12, wherein the peripheral unit is powered during the first time slots by the first current flow from the control unit (2) to the peripheral unit (3). In this way, in case of activation by the control unit, for example, the low-power electronics of the peripheral unit, specifically the driver device and the information-processing electronics, including the communication logic and/or the activation of the power electronics, may be powered.